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STUDIES IN THE COMPOSITION AND DISTRIBUTION OF THE OKLAHOMA FLORA—XXI¹

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CONTINUED investigations of our state's flora have resulted in additional data concerning its composition and distribution. In this paper the taxa not found listed in monographs, floras, checklists, and similar publications as occurring in Oklahoma are prefixed with an asterisk. There are 34 such entities recorded here. Four of them are newly described forms. About one-third of these additions were collected in southeastern Oklahoma, mostly in McCurtain County. The Ozark region in the northeast, and the two or three southwestmost counties each provided about one-fifth of the species listed. The rest came from various parts of the state. Unless otherwise indicated the cited specimens are to be found in the Herbarium of Oklahoma A. & M. College at Stillwater.

BOTRYCHIUM DISSECTUM Spreng., forma *OBLIQUUM* (Muhl.) Fern. is little known in the state. Stemen and Myers in their Flora, p. 17, state that it occurs in McCurtain County. The only material I have seen is *Coryell 715*, edge of pine-oak woods 6 miles southeast of Bethel, McCurtain County, Oct. 22, 1950.

CHEILANTHES WOOTONI Maxon has been reported from the Wichita Mts. of southwestern Oklahoma. We also have it as *F. C. Green*, collected on Hallock's Ranch, Cimarron County.

**ARISTIDA BARBATA* Fourn. is an unbranched perennial with an open panicle having glandular tissue in the axil of each panicle-branch, and with the first glume a little shorter than the second one. It is represented from Cimarron County by the following: *Waterfall 7479*, base of Black Mesa, 4 miles north of Kenton, July 9, 1947; *Waterfall 8634*, ditch 13 miles west of Boise City, Aug. 22, 1948; *Waterfall 9740*, sandstone slopes,

¹ The 20 previous papers in this series have appeared under various titles in the last 14 years. Most of them were published in *RHODORA*.

5 miles south of Kenton, Oct. 7, 1950. It has been known previously from "western Texas to Arizona and central Mexico" according to Chase in the second edition of Hitchcock's Manual.

*ERAGROSTIS GLOMERATA (Walt.) L. H. Dewey, a rather large annual with a narrow panicle having stiffly ascending branches and small spikelets 2-3 mm. long, is represented by *Chaffin*, Coal County, Sept. 9, 1949. In Hitchcock's Manual the range is given for as far west as "Missouri and eastern Texas."

*ERIANTHUS GIGANTEUS (Walt.) Muhl. has a relatively broad inflorescence (mostly 2.5 to 3 times as long as wide) with copious brownish hairs at the bases of the spikelets, these being about twice as long as the spikelets (excluding the awns). The terete awns are neither spirally coiled at their bases, nor strongly divergent in their upper parts. This species was found in McCurtain County and collected as *Waterfall 10417*, oak-hickory-pine woods, 3 miles north of Tom, Oct. 13, 1953. Previously it has been known from as far west as Arkansas and eastern Texas according to Chase in Hitchcock's Manual.

*LEPTOCHLOA UNINERVIA (Presl) Hitchc. & Chase was collected in water on the north arm of Hickory Creek, Love County, as *Harris*, July 10, 1949. Chase (op. cit.) ascribes this species to both Texas and Louisiana.

*PANICUM AGROSTOIDES Spreng., var. RAMOSIUS (Mohr) Fern., with branches loosely floriferous, was collected as *Waterfall 9799*, edge of *Taxodium* swamp, 3 miles south of Eagletown, McCurtain County, Oct. 21, 1950. Fernald (Gray's Manual, ed. 8) includes Texas and Missouri in the western range of this variety.

*PANICUM REVERCHONI Vasey. So referred are: *Waterfall 7747*, gypsum hills along Elm Fork of Red River, 3 miles west and 14 south of Erick, Harmon County, June 3, 1948; *Waterfall 7802*, along Red River at base of gypsum escarpment, 4 miles east and 4 south of Eldorado, Jackson County, June 5, 1948. In the second edition of Hitchcock's Manual the species is said to occur only in Texas.

*PASPALUM LAEVE Michx., var. PILOSUM Scribn. (*P. plenipilum* Nash, *P. longipilum* Nash). Referred to this taxon, because the sheaths and blades are strongly pilose, are *Waterfall 9858*, edge of pond in oak-pine woods, 2 miles southeast of Bethel, McCurtain County, Oct. 22, 1950, and *Waterfall 10480*, prairie, 1 mile south of Tom, McCurtain County, Oct. 23, 1950. Fernald (op. cit.) says that this variety extends north to southern Missouri.

*SPHENOPHOLIS FILIFORMIS (Chapm.) Scribn. So referred is *Waterfall 6916*, in an oak forest on a cherty hillside, 8 miles south of Wyandotte, Ottawa County, June 6, 1947. Fernald (op. cit.) says that it occurs from "Fla. n. to Va. and Tenn."

*CAREX FLACCOSPERMA Dewey was collected as *Waterfall 9322*, edge of swamp, 7 miles south and 1 east of Idabel, McCurtain County, April 15, 1950. It is somewhat similar to *C. amphibola*, but has a greater number of perigynia in a longer spike, and the pistillate scales are only

about one-third as long as the perigynia. It was previously known (according to Fernald, op. cit.) from as far west as Texas and southeastern Missouri.

**CAREX HALEANA* Olney. So referred are the following because they have small perigynia (1–1.5 mm. wide) and consequently narrower spikes than *C. granularis*. *Waterfall 6900*, along small spring-fed stream in shade of hickories in an elm-ash-sugar maple forest, south of Wyandotte, Ottawa County, June 6, 1947; *Waterfall 10034*, open woods along creek bottom, 10.5 miles west and 3 north of Tahlequah, Cherokee County, June 18, 1951.

**CAREX OXYLEPIS* Torr. & Hook. is represented by *Aven* and *Ruth Nelson* and *George Goodman 5599*, marshy ground along stream, Ouachita Mountains, about 15 miles north of Broken Bow, McCurtain County, April 21, 1946 (OU). It has been recorded previously (Gray's Manual, ed. 8) from as far west as Texas and southeastern Missouri.

**CAREX ROSEA* Schkuhr was collected as *Waterfall 9630*, in deep woods along Little River, 3 miles northeast of Idabel, McCurtain County, April 16, 1950. Mackenzie (N. Am. Fl. 18 (1): 45–46) says that specimens were examined from Louisiana, Arkansas and Missouri.

**CAREX ROSEA* Schkuhr, var. *TEXENSIS* Torr. The author believes that Torrey's original concept indicates the relationship of this taxon better than separating it as a distinct species as has been done by Bailey (Mem. Torr. Bot. Cl. 5: 97. 1894), or treating it as a variety of *C. retroflexa* as was done by Fernald (RHODORA 8: 166. 1906). The principal difference between var. *rosea* and var. *texensis* seems to be the serrulate beak and upper part of the perigynium of the latter. We have var. *texensis* as *Waterfall 10691*, wooded bottom along Mountain Fork in Beaver's Bend State Park, 7 miles north and 4 east of Broken Bow, McCurtain County, April 26, 1952; *Robbins 2882*, rich soil in flood plain woods on north bank of Little River, 6.5 miles south of Broken Bow, McCurtain County, April 10, 1945 (OU); *Robbins 2951*, rich moist soil in oak-hickory woods about 0.5 mile southeast of Ada, Pontotoc County, April 28, 1948 (OU).

**CAREX STRIATULA* Michx. So referred is *Little* and *Olmstead 1581*, *Quercus alba* climax forest association, uncut and unburned, southwest part of T4S, R25E, McCurtain County, June 5, 1930 (OU). The fruiting culms are mostly twice as long as the basal leaves, and are not winged.

**CYPERUS POLYSTACHYOS* Rottb., var. *TEXENSIS* (Torr.) Fern. was collected as *Waterfall 11162*, along creek running through woods, 3 miles south of Broken Bow, McCurtain County, Oct. 10, 1952. It somewhat resembles *C. rivularis*, but has linear to linear-oblong achenes about 0.5 mm. wide.

**ELEOCHARIS LANCEOLATA* Fern. with capillary culms, lanceolate-acuminate spikelets and acute scales is represented by *Waterfall 10277*, along creek in open woods, 2 miles east of Braggs, Muskogee County, July 24, 1951 and by *Waterfall 8521*, along creek in wooded hills, 2 miles

north of Broken Bow, McCurtain County, Aug. 9, 1948. It has been known previously² only from Arkansas and Texas.

*TRADESCANTIA OHIENSIS Raf., forma **pilosa** Waterfall, f. nov., vaginis inferioribus pilosis. The TYPE is *Waterfall 10018*, prairie along railroad right-of-way, 2.5 miles south of Braggs, Muskogee County, June 12, 1951. It is in the herbarium of Oklahoma A. & M. College. Isotypes have been distributed to several other herbaria. We have additional material from Pushmataha, Pontotoc, Payne and Cleveland Counties. The lower sheaths are rather abundantly pilose in most of the specimens. In a few the pilosity is somewhat sparse.

*TRADESCANTIA ERNESTIANA Anderson and Woodson, forma **alba** Waterfall, f. nov., petalis albis. The TYPE of the white-flowered form is *Wallis 395* on flint bluff, 3.6 miles northeast of Tahlequah, Cherokee County, May 9, 1951. It is in the herbarium of Oklahoma A. & M. College.

*CHENOPODIUM PUMILIO R. Br. (*C. carinatum* of auths., not R. Br.). We have the following collections: *Waterfall 11204*, along creek running through oak-hickory woods in mountains, 3 miles north of Broken Bow, McCurtain County, Oct. 11, 1952; *Waterfall 11211*, along Little River, Honobia, Pushmataha County, Oct. 12, 1952; *McCoy 3113*, rocky feed lot near Breco Lake, 3 miles south of Ada, Pontotoc County, July 6, 1952.

*LEPIDIUM AUSTRINUM Small. So referred are: *Demaree 12567*, Arbuckle Mts. near Turner Falls, Murray County, May 26, 1936; *Elwell 107*, near Guthrie, Logan County, June 15, 1938; *Waterfall 2700*, railroad, 2 miles south and 4 east of Britton, Oklahoma County, May 17, 1941. The fruits are slightly appressed-hairy, and the stems are rather noticeably hirsute. Hitchcock³ reports this species from "central and southwestern Texas and Mexico."

*PSORALEA TENUIFLORA Pursh, forma **ALBA** Steyermark was collected as *Pinson*, prairie 5 miles north of Shawnee, Pottowatomie County, May 13, 1953.

*CENTAUREUM TEXENSE (Griseb.) Fern. was collected in the Wichita Mountains of southwestern Oklahoma as *Waterfall 9129*, limestone slopes, 13 miles west and 3 north of Elgin, Comanche County, July 5, 1949. Tidestrom and Kittell, in their *Flora of Arizona and New Mexico*, state that this species ranges from Texas to southern New Mexico.

*PHACELIA STRICTIFLORA (Engelm. & Gray) Gray, var. **ROBBINSII** Constance, forma **albiflora** Waterfall, f. nov., corollis albis. The TYPE is *Waterfall 11277*, sand in opening in post oak—black jack woods, 7 miles south of Antlers, Pushmataha County, April 17, 1953. It is in the herbarium of Oklahoma A. & M. College. The white-flowered form was rather rare among large numbers of lavender-flowered plants.

*HEDEOMA SANCTA Small. So referred is *Waterfall 9440*, bank of Red River under *Juniperus Pinchoti*, 4 miles east and 4 south of Eldorado,

² SVENSON, H. K. *Monographic Studies in the Genus Eleocharis*. RHODORA 31: 207-208. 1929.

³ HITCHCOCK, C. LEO. *The Genus Lepidium in the United States*. Madrono 3: 287-288. 1936.

Jackson County, May 13, 1950. The calyx tubes are about 5 mm. long, while the subtending ovate leaves are about 1 cm. long. Small, in his "Flora" states that the species occurs "in dry soil, Texas."

**LYCOPUS RUBELLUS* Moench, var. *ARKANSANUS* (Fresn.) Benner was collected as *Waterfall 11176*, growing on cypress knees (*Taxodium*) in dried-up cypress swamp, 3 miles south of Eagletown, McCurtain County, Oct. 10, 1952. Another number, *11183*, was taken from a more conventional habitat, the edge of the swamp, at the same time. The species has been known previously according to Fernald (Gray's Manual) from as far west as Arkansas and northeastern Texas.

**DATURA QUERCIFOLIA* HBK., characterized by the fruit having unequal prickles with the larger ones being 1.5–2 cm. long and much flattened and widened toward their bases, was collected as *Waterfall 9700*. It was collected in sand in the bed of the Cimarron River, one-half mile north of Kenton, Cimarron County, Oct. 6, 1950. It was also observed in several places in the valleys near Kenton. Gray, in the Synoptic Flora (2 (1): 240. 1886), states that it occurs from the southwestern borders of Texas to Arizona, and that it is naturalized from Mexico. Essentially the same information is given by Tidestrom and Kittell in their Flora of Arizona and New Mexico.

**LYCIUM PALLIDUM* Miers. On a trip to the Black Mesa area of Cimarron County in the northwestern end of the Oklahoma panhandle the author found a small stand of a species of *Lycium* in a vegetative state. After seeing it for several years, but never finding it in flower, he dug up a plant, and transplanted it in Stillwater. On May 1, 1952 it flowered and proved to be *L. pallidum*. On May 30, 1952 the original find, "on a stony ridge 6 miles north of Kenton, Cimarron County," was revisited and found in flower. It was collected as *Waterfall 10760*. The corollas are greenish, and the ovaries are on, or surrounded by, red discs. Hitchcock's⁴ statement concerning distribution includes "western Texas, southern Colorado, New Mexico . . ."

**NICOTIANA TRIGONOPHYLLA* Dunal was mentioned earlier by the author in "A list of species of southwestern affinities,"⁵ but has not been otherwise reported from the state. Although he has known the species for several years, the author unintentionally omitted it from his recent enumeration of the Oklahoma Flora.⁶ We have it as *Waterfall 7801*, 4 miles east and 4 south of Eldorado, Jackson County, June 5, 1948. It has been observed several times since along the Red River in this area, but is known nowhere else in the state.

CASTILLEJA PURPUREA* (Nutt.) Don, forma **corallina Waterfall, forma nov., bracteis et calycibus pallido-corallinis. The forma with coral-pink bracts and calyces is occasional in colonies of forma *purpurea* near Hugo

⁴ HITCHCOCK, C. LEO. *A Monographic Study of the Genus Lycium of the Western Hemisphere.* Ann. Mo. Bot. Gard. 19: 299–304. 1932.

⁵ WATERFALL, U. T. *Some Additions to the Oklahoma Flora.* RHODORA 52: 20. 1950.

⁶ WATERFALL, U. T. *A Catalogue of the Flora of Oklahoma.* 1–91. 1952. Publ. Research Found., Okla. A. & M. College, Stillwater.

and Ft. Towson near the type locality of *Euchroma purpurea* Nutt., "on rocks in the hilly prairies of Red River."⁷ The TYPE is *Waterfall 9287*, prairies on "blackland" (shallow limestone-derived soil), 0.5 mile north of the junction of Highways 271 and 70, northwest of Hugo, Choctaw County, April 15, 1950. It is in the herbarium of Oklahoma A. & M. College at Stillwater.

IBERVILLEA LINDHEIMERI (Gray) Greene has been known from the Arbuckle Mts., where it is uncommon, for several years. We have additional material from the following counties of southwestern Oklahoma: *Waterfall 9406*, twining on *Lycium Berlandieri*, gypsum flat, 5.5 miles south of Hollis, Harmon Co., May 13, 1950; *Waterfall 9438*, gypsum bluffs along Red River, 4 miles east and 4 south of Eldorado, Jackson Co., May 13, 1950; *Waterfall 7679*, granite mountainside, north of Granite, July 28, 1947.

**BIDENS ARISTOSA* (Michx.) Britt., var. *MUTICA* (Gray) Gattinger. The variety with awns lacking has been known previously from as far west as Missouri and western Louisiana according to Sherff.⁸ We have it as *Waterfall 9832*, wet spot, 1 mile south of Idabel, McCurtain County, Oct. 21, 1950.

**CENTAUREA SOLSTITIALIS* L. We have this introduced species as *Engleman 510*, in irrigated pasture of Elmo Jones near Goodwell, Texas County, July 20, 1953; also we have a specimen "collected by a farmer" near Sapulpa, Creek County, July 15, 1947.

**CIRSIUM VULGARE* (Savi) Tenore (*C. lanceolatum* of auths., not Hill) was collected as *Waterfall 7581*, edge of swamp, 8 miles south and 3 east of Idabel, McCurtain County, July 18, 1947, and as *Wallis 879*, roadside ditch, 3.8 miles south of Tahlequah and 5.2 miles southeast, Cherokee County, Aug. 6, 1951.

**COREOPSIS GRANDIFLORA* Hogg., var. *LONGIPES* (Hook.) T. & G. Referred here is *Waterfall 9451*, northern slopes of granite mountains, south of Lake Altus, Kiowa County, May 14, 1950. The collection has long peduncles (up to 30 cm. long) as Sherff⁹ describes var. *longipes*. The flowering heads (including the rays) are 5–7 cm. across; the rays are 2–3 cm. long. Sherff cites material from Texas only.

**LIATRIS PUNCTATA* Hook., forma *ALBA* Horr & McGregor. This white-flowered form was collected by *Beck* and *Patterson* in a prairie, 3 miles north of Stillwater, Payne County, Oct. 2, 1951.—DEPARTMENT OF BOTANY AND THE RESEARCH FOUNDATION, OKLAHOMA A. & M. COLLEGE, STILLWATER.

⁷ Trans. Am. Phil. Soc. 5 (n.s.): 180–181. 1837.

⁸ Field Museum of Nat. Hist.—Botany 16: 214–217. 1937.

⁹ Field Mus. Nat. Hist.—Botany 11: 354. 1936.